Final Report

Arizona Grain Research and Promotion Council

August, 2003

Testing Low Input Barley and Wheat Lines

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TITLE: Testing low input barley and wheat lines

INVESTIGATOR: *Mike Ottman*, Extension Agronomist, Univ. of Arizona

DURATION: November, 2002 to November, 2003

SUMMARY: This work represents the second year of a 3-year testing program to identify low input wheat and barley entries with higher test weight and less lodging than Solum barley. Twenty lines each of barley and wheat were grown at the Maricopa Agricultural Center with one, two, or seven irrigations. Several barley entries yielded similar to Solum but had higher test weight and less lodging. Several wheat entries exhibited good yield potential and lodging resistance.

BACKGROUND: The low input barley line, Solum, was released in 1992 by Dr. Tom Ramage. Dr. Ramage continued his breeding work with low input barley after Solum was released, and also worked with low input wheat. Dr. Ramage retired in 1999 and left me with over 200 barley and wheat lines adapted to water stress conditions. These lines were screened in 2001, and 20 selected wheat and barley lines were tested in 2002 grown with one, two, or seven irrigations. These 20 lines were tested again in 2003.

OBJECTIVES: Identify low input barley and wheat lines that have less lodging and higher test weight than Solum but have equal or better grain yield.

DESCRIPTION OF THE WORK: Low input barley (20 lines) and wheat (20 lines) plus four check varieties were evaluated in Field 107 at the Maricopa Agricultural Center during the 2002-2003 growing season. The soil type was a Casa Grande sandy loam. The previous crop was barley, and an irrigation was applied on November 1, 2002 to germinate any barley or weed seed. The surface 6 inches of soil was sampled before planting and contained 18.8 ppm NO_3-N and 6.6 ppm P. Low input barley and wheat lines were planted in 5 ft x 14 ft plots on November 25, 2002. The seeding rate was variable depending on the irrigation regime (Table 1). An irrigation to germinate the seed was applied on Nov 26 and subsequent irrigations were applied at various times depending on the irrigation regime (Table 1). Fertilizer was applied preplant as ammonium phosphate sulfate (16-20-0) at a rate of 48 lbs N/acre and 60 lbs P_2O_5/acre. Nitrogen fertilizer was applied at of rate of 72 lbs N/acre as urea (45-0-0) on 29 Jan for the two- and seven-irrigation regime. Nitrogen fertilizer was applied to the seven-irrigation regime at a rate of 50 lbs N/acre as urea (45-0-0) on 27 Feb, 19 Mar, and 1 Apr (Table 1). Heading, flowering, maturity, plant height, and lodging were noted before harvest. A small plot combine was used to harvest the grain at variable dates depending on the irrigation regime (Table 1). The grain was weighed and yield was estimated. Barley grain samples were cleaned by running through a head thresher twice, and wheat grain samples were cleaned by running through a seed cleaner once. Test weight was determined from these cleaned samples using a 1-pint container.

RESULTS: The average maximum temperature for January was the highest on record, and the average minimum temperature for January was also very high (Table 2). Consequently, the crop grew very quickly early in the season, especially the barley. March and April were cooler than average, which promoted a long growing season. Every month of the growing season from December through May received below average rainfall except for February, where rainfall was slightly above average. The weather was very favorable for growth of low input wheat and barley.

Grain yield and other characteristics of the entries varied depending on irrigation number (Tables 3 and 4). Grain yields averaged about 3000 lbs/acre with one or two irrigations and about 5000 lbs/acre with seven irrigations. This year, the 1-irrigation regime most accurately reflects the environment intended for these entries. The 2- and 7-irrigation regimes had excessive lodging, which is good for screening purposes.

When grown with one or two irrigations, Solum was among the top six highest yielding entries in the barley and wheat tests (Tables 5 and 6). However, Solum was among the lowest in test weight and highest in lodging. Several barley entries had yields similar to Solum with one or two irrigations, but had higher test weight and less lodging. The wheat entries were less promising than the barley entries with one or two irrigations.

The barley and wheat entries will be tested for one more year before selecting entries for potential release.

ACKNOWLEDGMENTS: The technical assistance of Melinda Main is greatly appreciated.

Table 1. Cultural information for the various irrigation regimes.

	One irrigation	Two irrigations	Seven irrigations
Seeding rate (lbs/acre)	20	40	80
Nitrogen rate (lbs N/A)	50	122	272
Irrigation dates	26 Nov 02	26 Nov 02 29 Jan 03	26 Nov 02 29 Jan 03 27 Feb 03 19 Mar 03 01 Apr 03 11 Apr 03 25 Apr 03
Harvest dates	14 May 03	16 May 03 (Wheat) 21 May 03 (Barley)	27 May 03

Table 2. Climatic data for Maricopa during the 2003 growing season compared to the long-term average. The rankings of the months in the 18 years of data are from low to high. The climate data was obtained from AZMET.

Climate variable	Unit	Year(s)	Dec	Jan	Feb	Mar	Apr	May	Dec-May
Max Temp. (ºF)	Rank of 18	2003	6	18	6	6	4	13	11
	ºF	2003	64	73	68	76	82	95	76
	ºF	1987-2003	65	66	70	76	85	94	76
Min Temp. (ºF)	Rank of 18	2003	14	16	14	6	4	12	14
	ºF	2003	37	39	42	43	48	60	45
	ºF	1987-2003	35	36	40	44	51	59	44
Ppt. (inches)	Rank of 18	2003	10	9	12	7	9	1	10
	inches	2003	0.43	0.51	1.18	0.24	0.16	0	2.52
	inches	1987-2003	0.82	0.79	0.97	0.94	0.33	0.18	3.98

Table 3a. Grain yield and other characteristics of the barley lines grown with one irrigation.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Barley	1	1	3555	49.2	35	0	12-Feb	18-Feb	10-Apr
Barley	1	2	4475	51.1	39	0	19-Feb	23-Feb	11-Apr
Barley	1	3	2587	48.4	41	0	19-Feb	26-Feb	7-Apr
Barley	1	4	2945	50.6	40	0	3-Mar	10-Mar	11-Apr
Barley	1	5	2640	47.8	38	13	19-Feb	23-Feb	7-Apr
Barley	1	6	3456	49.6	32	0	12-Feb	17-Feb	13-Apr
Barley	1	7	2977	48.3	38	0	19-Feb	23-Feb	6-Apr
Barley	1	8	3671	48.3	38	6	13-Feb	19-Feb	11-Apr
Barley	1	9	2854	50.8	39	0	3-Mar	12-Mar	11-Apr
Barley	1	10	3848	46.0	32	0	19-Feb	23-Feb	10-Apr
Barley	1	11	3516	47.5	32	0	7-Feb	12-Feb	2-Apr
Barley	1	12	2787	47.6	43	0	12-Feb	17-Feb	12-Apr
Barley	1	13	3889	46.5	32	0	12-Feb	17-Feb	3-Apr
Barley	1	14	3018	50.4	39	0	1-Mar	13-Mar	10-Apr
Barley	1	15	2955	50.1	41	0	3-Mar	11-Mar	11-Apr
Barley	1	16	3317	51.3	41	0	3-Mar	8-Mar	10-Apr
Barley	1	17	3015	51.3	38	0	3-Mar	13-Mar	11-Apr
Barley	1	18	3601	49.3	40	13	21-Feb	26-Feb	7-Apr
Barley	1	19	3030	43.8	42	13	24-Feb	1-Mar	9-Apr
Barley	1	20	3568	48.7	34	13	10-Feb	16-Feb	10-Apr
Barley	1	Solum	3765	46.7	36	19	19-Feb	24-Feb	4-Apr
Barley	1	Barcott	3945	46.5	32	0	21-Feb	28-Feb	7-Apr
Barley	1	Xeric	3371	54.4	44	0	27-Feb	9-Mar	15-Apr
Barley	1	Y. rojo	3305	56.9	32	0	26-Feb	8-Mar	17-Apr
Avg.			3337	49.2	37	3	20-Feb	27-Feb	9-Apr
LSD(5%)			474	1.58	3.7	11.3	2.4	3.4	2.1

Table 3b. Grain yield and other characteristics of the barley lines grown with two irrigations.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Barley	2	1	3778	47.6	39	81	13-Feb	18-Feb	9-Apr
Barley	2	2	4432	49.7	42	75	23-Feb	28-Feb	14-Apr
Barley	2	3	2995	46.5	40	94	19-Feb	24-Feb	11-Apr
Barley	2	4	2491	48.5	40	69	4-Mar	12-Mar	11-Apr
Barley	2	5	3278	45.9	40	88	17-Feb	22-Feb	7-Apr
Barley	2	6	3890	48.6	39	31	11-Feb	17-Feb	10-Apr
Barley	2	7	3433	46.1	43	75	20-Feb	26-Feb	5-Apr
Barley	2	8	3815	47.2	40	88	15-Feb	20-Feb	15-Apr
Barley	2	9	2691	50.5	42	50	5-Mar	12-Mar	11-Apr
Barley	2	10	3396	46.4	37	88	20-Feb	26-Feb	17-Apr
Barley	2	11	4339	46.6	42	94	6-Feb	10-Feb	5-Apr
Barley	2	12	3287	47.0	43	63	10-Feb	14-Feb	10-Apr
Barley	2	13	4009	46.2	38	100	12-Feb	17-Feb	8-Apr
Barley	2	14	3020	49.6	42	38	4-Mar	12-Mar	10-Apr
Barley	2	15	3203	50.3	42	50	5-Mar	12-Mar	14-Apr
Barley	2	16	2596	49.4	41	63	3-Mar	13-Mar	12-Apr
Barley	2	17	2618	49.3	41	44	4-Mar	13-Mar	10-Apr
Barley	2	18	2664	48.6	39	94	22-Feb	27-Feb	10-Apr
Barley	2	19	3229	41.9	44	81	24-Feb	4-Mar	18-Apr
Barley	2	20	3660	47.1	38	94	9-Feb	15-Feb	10-Apr
Barley	2	Solum	3984	45.4	39	100	20-Feb	26-Feb	6-Apr
Barley	2	Barcott	3429	42.4	37	69	23-Feb	28-Feb	7-Apr
Barley	2	Xeric	2941	51.2	47	25	4-Mar	13-Mar	16-Apr
Barley	2	Y. rojo	3222	53.4	34	0	6-Mar	13-Mar	17-Apr
Avg.			3350	47.7	40	69	22-Feb	28-Feb	11-Apr
LSD(5%)			689	1.84	2.4	25.6	2.9	3.4	4.6

Table 3c. Grain yield and other characteristics of the barley lines grown with seven irrigations.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Barley	7	1	5720	47.6	35	69	13-Feb	19-Feb	24-Apr
Barley	7	2	5945	47.8	36	69	20-Feb	25-Feb	5-May
Barley	7	3	4385	45.8	41	81	18-Feb	26-Feb	26-Apr
Barley	7	4	5860	51.6	38	63	5-Mar	11-Mar	25-Apr
Barley	7	5	4431	48.0	41	75	17-Feb	20-Feb	18-Apr
Barley	7	6	5385	48.5	34	25	13-Feb	18-Feb	18-Apr
Barley	7	7	4552	46.3	42	69	24-Feb	28-Feb	16-Apr
Barley	7	8	6116	47.3	38	88	16-Feb	21-Feb	29-Apr
Barley	7	9	5166	51.8	41	56	5-Mar	14-Mar	27-Apr
Barley	7	10	4935	45.0	35	56	21-Feb	28-Feb	23-Apr
Barley	7	11	5038	46.6	33	81	4-Feb	10-Feb	8-Apr
Barley	7	12	4845	46.8	41	50	11-Feb	15-Feb	22-Apr
Barley	7	13	4972	45.8	37	88	12-Feb	17-Feb	20-Apr
Barley	7	14	5084	51.9	39	69	6-Mar	14-Mar	24-Apr
Barley	7	15	4794	52.4	42	75	8-Mar	17-Mar	29-Apr
Barley	7	16	4805	51.5	42	56	5-Mar	13-Mar	23-Apr
Barley	7	17	5023	52.3	42	56	7-Mar	16-Mar	26-Apr
Barley	7	18	3788	48.3	42	88	22-Feb	27-Feb	27-Apr
Barley	7	19	6109	44.6	42	94	24-Feb	1-Mar	28-Apr
Barley	7	20	5098	48.4	39	94	10-Feb	15-Feb	21-Apr
Barley	7	Solum	5116	47.4	40	100	20-Feb	25-Feb	22-Apr
Barley	7	Barcott	5875	49.0	35	63	23-Feb	28-Feb	18-Apr
Barley	7	Xeric	5082	58.5	42	81	3-Mar	13-Mar	1-May
Barley	7	Y. rojo	5644	59.6	35	0	5-Mar	12-Mar	29-Apr
Avg.			5157	49.3	39	68	22-Feb	28-Feb	23-Apr
LSD(5%)			780	1.80	3.8	30.5	2.8	3.7	5.1

Table 4a. Grain yield and other characteristics of the wheat lines grown with one irrigation.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Wheat	1	1	3507	58.8	41	0	20-Feb	3-Mar	14-Apr
Wheat	1	2	1964	57.2	43	0	17-Feb	24-Feb	13-Apr
Wheat	1	3	2337	58.7	44	0	21-Feb	28-Feb	13-Apr
Wheat	1	4	1938	57.4	40	0	17-Feb	23-Feb	13-Apr
Wheat	1	5	2826	59.6	36	0	18-Feb	26-Feb	13-Apr
Wheat	1	6	2839	58.9	37	0	15-Feb	22-Feb	11-Apr
Wheat	1	7	2362	57.4	45	0	20-Feb	28-Feb	11-Apr
Wheat	1	8	2261	60.3	36	0	15-Feb	22-Feb	10-Apr
Wheat	1	9	2355	60.2	40	0	18-Feb	26-Feb	10-Apr
Wheat	1	10	2262	58.4	36	0	22-Feb	22-Feb	11-Apr
Wheat	1	11	3341	58.8	37	0	19-Feb	28-Feb	15-Apr
Wheat	1	12	3939	60.4	37	0	21-Feb	1-Mar	14-Apr
Wheat	1	13	1725	59.2	38	6	20-Feb	1-Mar	11-Apr
Wheat	1	14	3014	60.6	42	0	16-Feb	22-Feb	11-Apr
Wheat	1	15	3323	59.9	38	0	19-Feb	26-Feb	12-Apr
Wheat	1	16	2847	61.0	34	0	16-Feb	23-Feb	12-Apr
Wheat	1	17	1970	60.8	38	0	16-Feb	22-Feb	11-Apr
Wheat	1	18	3256	54.8	42	0	23-Feb	4-Mar	14-Apr
Wheat	1	19	2739	59.1	38	0	16-Feb	21-Feb	13-Apr
Wheat	1	20	2416	58.7	38	0	14-Feb	22-Feb	11-Apr
Wheat	1	Solum	3340	47.5	35	25	20-Feb	26-Feb	6-Apr
Wheat	1	Barcott	3813	48.3	29	0	20-Feb	25-Feb	6-Apr
Wheat	1	Xeric	3217	55.7	45	0	27-Feb	10-Mar	15-Apr
Wheat	1	Y. rojo	3356	58.4	31	0	27-Feb	11-Mar	17-Apr
Avg.			2790	57.9	38	1	19-Feb	26-Feb	12-Apr
LSD(5%)			435	1.81	3.2	3.6	4.3	3.2	2.5

Table 4b. Grain yield and other characteristics of the wheat lines grown with two irrigations.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Wheat	2	1	3252	51.6	43	25	23-Feb	5-Mar	15-Apr
Wheat	2	2	2936	54.1	44	19	19-Feb	28-Feb	13-Apr
Wheat	2	3	2579	52.5	48	75	23-Feb	2-Mar	14-Apr
Wheat	2	4	2792	56.0	43	31	18-Feb	26-Feb	13-Apr
Wheat	2	5	3080	54.1	40	44	20-Feb	3-Mar	13-Apr
Wheat	2	6	2950	53.4	43	88	16-Feb	1-Mar	11-Apr
Wheat	2	7	2519	51.5	46	19	25-Feb	9-Mar	11-Apr
Wheat	2	8	3309	57.4	40	6	15-Feb	25-Feb	10-Apr
Wheat	2	9	2773	54.1	42	38	21-Feb	2-Mar	10-Apr
Wheat	2	10	3143	54.1	40	19	18-Feb	2-Mar	12-Apr
Wheat	2	11	3383	51.4	38	6	21-Feb	5-Mar	14-Apr
Wheat	2	12	2897	52.3	40	25	24-Feb	8-Mar	11-Apr
Wheat	2	13	2390	54.7	42	81	21-Feb	1-Mar	12-Apr
Wheat	2	14	2949	53.8	46	75	18-Feb	1-Mar	10-Apr
Wheat	2	15	3018	52.8	42	31	24-Feb	8-Mar	13-Apr
Wheat	2	16	3366	56.1	39	6	18-Feb	27-Feb	9-Apr
Wheat	2	17	2298	57.3	46	25	17-Feb	26-Feb	10-Apr
Wheat	2	18	2130	48.7	43	38	27-Feb	8-Mar	14-Apr
Wheat	2	19	2914	55.6	42	6	15-Feb	25-Feb	12-Apr
Wheat	2	20	2752	56.6	41	6	14-Feb	23-Feb	11-Apr
Wheat	2	Solum	3579	45.6	36	100	21-Feb	27-Feb	6-Apr
Wheat	2	Barcott	3620	45.0	37	50	23-Feb	28-Feb	8-Apr
Wheat	2	Xeric	2913	52.0	47	19	3-Mar	13-Mar	17-Apr
Wheat	2	Y. rojo	3341	55.0	36	0	4-Mar	15-Mar	15-Apr
Avg.			2953	53.2	42	35	21-Feb	3-Mar	12-Apr
LSD(5%)			588	1.94	2.9	22.3	3.1	3.9	2.9

Table 4c. Grain yield and other characteristics of the wheat lines grown with seven irrigations.

Crop	Irrigations	Entry	Grain yield	Test weight	Plant height	Lodging	Heading	Anthesis	Maturity
			lbs/A	lbs/bu	inches	%			
Wheat	7	1	5902	60.9	41	56	23-Feb	6-Mar	24-Apr
Wheat	7	2	3668	58.6	45	44	20-Feb	28-Feb	24-Apr
Wheat	7	3	5568	61.0	42	81	24-Feb	4-Mar	25-Apr
Wheat	7	4	3803	59.6	45	50	18-Feb	28-Feb	22-Apr
Wheat	7	5	5289	60.1	39	56	20-Feb	1-Mar	27-Apr
Wheat	7	6	5812	60.1	38	75	17-Feb	28-Feb	23-Apr
Wheat	7	7	4972	61.1	47	75	25-Feb	7-Mar	28-Apr
Wheat	7	8	4898	61.4	40	19	16-Feb	27-Feb	22-Apr
Wheat	7	9	4571	60.1	40	94	19-Feb	1-Mar	27-Apr
Wheat	7	10	5012	59.5	40	50	19-Feb	28-Feb	26-Apr
Wheat	7	11	6122	60.1	38	56	22-Feb	4-Mar	26-Apr
Wheat	7	12	6422	61.6	37	63	24-Feb	5-Mar	27-Apr
Wheat	7	13	3395	60.0	39	81	20-Feb	1-Mar	24-Apr
Wheat	7	14	5622	61.7	46	75	18-Feb	27-Feb	23-Apr
Wheat	7	15	5524	62.2	39	100	23-Feb	7-Mar	26-Apr
Wheat	7	16	5173	62.9	39	6	21-Feb	2-Mar	26-Apr
Wheat	7	17	4907	59.0	42	75	19-Feb	28-Feb	23-Apr
Wheat	7	18	6776	60.9	40	88	26-Feb	9-Mar	30-Apr
Wheat	7	19	4876	60.9	42	44	16-Feb	26-Feb	23-Apr
Wheat	7	20	4182	60.7	39	31	15-Feb	24-Feb	19-Apr
Wheat	7	Solum	5633	46.5	30	94	20-Feb	28-Feb	25-Apr
Wheat	7	Barcott	5936	50.4	35	63	22-Feb	1-Mar	15-Apr
Wheat	7	Xeric	6108	59.1	44	75	27-Feb	9-Mar	28-Apr
Wheat	7	Y. rojo	5735	62.0	36	19	5-Mar	13-Mar	28-Apr
Avg.			5246	59.6	40	61	21-Feb	2-Mar	24-Apr
LSD(5%)			905	1.37	3.1	30.3	2.6	3.8	4.4

Table 5. Ranking of **barley** entries for grain yield, test weight, lodging, and physiological maturity. The entries are sorted by average yield ranking and were grown with various numbers of irrigations. The average ranking is presented for 2003 (’03) and 2002 (’02) for comparative purposes.

	Grain yield					Test weight					Lodging					Maturity				
	Irrigations			Avg.		Irrigations			Avg.		Irrigations			Avg.		Irrigations			Avg.	
Entry	1	2	7	‘03	‘02	1	2	7	‘03	‘02	1	2	7	‘03	‘02	1	2	7	‘03	‘02
2	1	1	3	*1*	1	5	5	14	8	7	10	13	12	13	7	16	19	24	21	13
8	6	6	1	*2*	19	16	13	17	14	16	19	17	20	20	19	20	20	22	22	15
Barcott	2	10	4	*3*	20	21	23	9	18	22	10	11	9	10	5	8	5	5	6	8
Solum	5	4	10	*4*	8	20	22	16	21	24	24	24	24	24	24	3	3	9	5	1
1	9	7	6	*5*	11	12	12	15	13	15	10	15	12	15	16	11	7	13	8	14
13	3	3	16	*6*	3	22	19	22	22	17	10	24	20	19	13	2	6	6	4	2
6	11	5	8	*7*	17	10	9	10	10	14	10	3	2	2	3	22	13	4	12	17
11	10	2	14	*8*	6	19	16	19	19	21	10	21	17	17	21	1	2	1	1	3
20	8	8	11	*9*	16	13	14	11	12	12	22	21	23	23	22	12	10	7	7	9
19	15	14	2	*10*	10	24	24	24	24	23	22	15	23	21	23	9	24	19	19	11
10	4	11	17	*11*	4	23	18	23	23	19	10	17	6	12	4	14	23	10	17	12
Yecora rojo	14	15	7	*12*	24	1	1	1	1	2	10	1	1	1	2	24	22	21	23	23
Xeric	12	19	13	*13*	21	2	2	2	2	1	10	2	17	8	1	23	21	23	24	24
14	16	17	12	*14*	14	8	6	5	6	6	10	4	12	7	6	10	13	13	10	18
7	18	9	21	*15*	22	15	20	20	20	20	10	13	12	14	11	4	1	2	2	4
4	20	24	5	*16*	12	7	11	7	9	10	10	11	9	9	10	18	15	14	16	19
9	21	20	9	*17*	2	6	3	6	3	5	10	7	6	5	17	16	16	18	18	22
12	22	12	18	*18*	13	18	15	18	15	18	10	9	3	4	18	21	9	9	13	10
18	7	21	24	*19*	15	11	10	12	11	4	22	21	20	22	14	7	9	17	9	6
17	17	22	15	*20*	5	3	8	4	4	9	10	5	6	3	8	20	11	16	15	21
15	19	16	20	*21*	7	9	4	3	5	3	10	7	15	11	12	16	18	21	20	16
16	13	23	19	*22*	9	4	7	8	7	8	10	9	6	6	9	14	17	11	14	20
5	23	13	22	*23*	18	17	21	13	16	13	22	17	15	18	20	5	4	4	3	5
3	24	18	23	*24*	23	14	17	21	17	11	10	21	17	16	15	7	15	15	11	7

Table 6. Ranking of **wheat** entries for grain yield, test weight, lodging, and physiological maturity. The entries are sorted by average yield ranking and were grown with various numbers of irrigations. The average ranking is presented for 2003 (’03) and 2002 (’02) for comparative purposes.

	Grain yield					Test weight					Lodging					Maturity				
	Irrigations			Avg.		Irrigations			Avg.		Irrigations			Avg.		Irrigations			Avg.	
Entry	1	2	7	‘03	‘02	1	2	7	‘03	‘02	1	2	7	‘03	‘02	1	2	7	‘03	‘02
Barcott	2	1	5	*1*	5	23	24	23	23	23	12	19	13	16	19	2	2	1	1	2
11	5	3	3	*2*	3	13	21	16	19	18	12	4	10	6	15	23	20	14	21	15
1	3	7	6	*3*	1	12	19	10	15	16	12	12	10	9	13	21	22	11	20	21
Solum	6	2	9	*4*	8	24	23	24	24	24	24	24	23	24	24	1	1	13	3	1
Yecora rojo	4	5	8	*5*	9	16	7	3	6	4	12	1	3	1	4	24	23	22	23	23
12	1	16	2	*6*	7	4	17	5	7	11	12	12	13	11	10	20	11	18	17	9
Xeric	9	15	4	*7*	4	21	18	20	22	19	12	9	16	13	16	23	24	22	24	24
16	11	4	14	*9*	14	1	4	1	1	3	12	4	1	2	3	12	3	16	9	14
15	7	10	12	*8*	6	7	15	2	4	8	12	15	24	19	20	13	18	16	16	4
6	12	11	7	*10*	13	11	14	14	13	15	12	23	16	20	12	8	11	6	7	17
14	10	12	10	*11*	12	3	13	4	3	9	12	21	16	17	8	6	5	6	5	3
18	8	24	1	*12*	2	22	22	9	20	22	12	17	21	18	23	20	20	24	22	22
5	13	9	13	*13*	11	8	9	15	11	14	12	18	10	15	22	17	16	20	19	13
10	19	8	15	*14*	18	17	10	19	17	17	12	9	8	8	14	11	12	16	13	11
8	20	6	18	*15*	22	5	1	6	2	2	12	4	3	3	2	4	5	4	2	12
19	14	14	19	*16*	23	10	6	11	8	13	12	4	6	5	11	17	14	8	12	19
3	18	20	11	*17*	17	15	16	8	14	12	12	21	20	22	21	17	21	12	18	16
7	16	21	16	*18*	20	19	20	7	18	20	12	9	16	12	17	8	9	22	14	20
20	15	19	21	*20*	24	14	3	12	9	7	12	4	4	4	7	6	9	2	4	18
9	17	18	20	*19*	15	6	12	13	10	10	12	17	23	21	9	3	5	20	8	5
2	22	13	23	*21*	21	20	11	22	21	21	12	9	6	7	18	17	16	10	15	7
17	21	23	17	*22*	16	2	2	21	5	1	12	12	16	14	1	8	7	6	6	8
4	23	17	22	*23*	10	18	5	18	16	5	12	15	8	10	5	14	16	4	10	6
13	24	22	24	*24*	19	9	8	17	12	6	23	22	20	23	6	11	13	10	11	10